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# COVID-19 Pandemic - An Update

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In December 2019, a cluster of cases of pneumonia of unknown cause was detected in Wuhan, Hubei Province, China. A novel coronavirus (SARS coronavirus-2 (SARS-CoV-2)) was subsequently identified. The associated disease is now referred to as COVID-19. The source of the outbreak has yet to be determined. A zoonotic source to the outbreak has not been identified yet, but investigations are ongoing.

SARS coronavirus-2 (SARS-CoV-2) is a non-segmented, positive sense RNA virus. It is part of the family of coronaviruses. This contains four corona viruses which are widely distributed and usually cause the common cold but can cause viral pneumonia in patients with comorbidities. SARS and MERS – these caused epidemics with high mortality which are somewhat similar to COVID-19. COVID-19 is most closely related to SARS. It binds via the angiotensin-converting enzyme 2 (ACE2) receptor located on type II alveolar cells and intestinal epithelia (Hamming 2004). This is the same receptor as used by SARS (hence the technical name for the COVID-19, “SARS-CoV-2”).

COVID doesn't appear to cause substantially reduced lung compliance (which is generally a hallmark finding of ARDS). The predominant problem might be either atelectasis or by alveolar inflammation. The virus is mutating, and virulence and transmission will shift over time unpredictably. There is evidence of more than one strain, and this may explain the variation in mortality. As of 12 March 2020, over 125,000 cases have been diagnosed in 125 countries and areas with a total of over 4,500 fatalities. Of these totals, over 44,000 cases and more than 1,400 deaths have been reported from countries outside mainland China. Within China, 84% of cases reported to date are in Hubei Province. There is evidence that human-to-human transmission is occurring. Hence, precautions to prevent human-to-human transmission are appropriate for both suspected and confirmed cases. Corona viruses are mainly transmitted by large respiratory droplets and direct or indirect contact with infected secretions. In addition to respiratory secretions, other coronaviruses have been detected in blood, faeces and urine.

- For symptomatic, unconfirmed in-patients meeting the COVID-19 case definition, current guidance is use of Personal Protection Equipment (PPE), including, a fluid resistant surgical mask, gloves, apron and eye protection if risk of splashing into the eyes.
- For confirmed cases of COVID-19, full PPE is needed with FFP3 respirator, disposable eye protection, preferably visor, long sleeved disposable gown and gloves
- For possible and confirmed cases of COVID-19 requiring an aerosol generating procedure, Full PPE is needed: FFP3 respirator, disposable eye protection, preferably visor, long sleeved disposable gown and gloves.

As corona viruses have a lipid envelope, a wide range of disinfectants are effective. PPE and good infection prevention and control precautions are effective at minimising risk but can never eliminate it.

Emerging information from these experiences has highlighted factors that could increase the risk of nosocomial transmission, such as delayed implementation of appropriate infection prevention and control measures combined persistence of coronavirus in the clinical setting. Under most circumstances, the amount of infectious virus on any contaminated surfaces is likely to have decreased significantly by 72 hours. In the absence of effective drugs or a vaccine, control of this disease relies on the prompt identification, appropriate risk assessment, management and isolation of possible cases, and the investigation and follow up of close contacts to minimise potential onward transmission. It is therefore important that standard precautions to include careful attention to hand hygiene and when handling any clinical waste, which must be placed in leak-proof clinical waste bags or bins and disposed of safely

**Hospital management**

Presentation of Covid-19 is that of typical viral pneumonia and management is to do the basics well, delivering supportive care. The majority of cases will present as a mild, self-limiting flu-like illness. The key principle is that those who can be managed at home should be; hospital admission should be avoided wherever possible. The cause of death in Covid-19 is respiratory failure from Acute Respiratory Distress Syndrome (ARDS), or in those with underlying chronic lung disease or other frailty.

**Signs and Symptoms**

- Most patients present with constitutional symptoms and lower respiratory symptoms: fever and cough
- Current Criteria for testing for Covid-19 includes (a) clinical/radiological pneumonia OR (b) flu-like symptoms OR (c) Adult respiratory distress syndrome (ARDS) AND (d) requiring hospital admission
- Patients may develop hypoxaemia and respiratory failure without breathlessness, particularly in the elderly. Up to 10% of patients can present initially with gastrointestinal symptoms (e.g. diarrhoea, nausea), which can precede the development of fever and dyspnoea
- Examination is generally non-specific; crackles may be present on auscultation, but the chest can be clear

**Clinical Management**

- Management is as for any viral pneumonia and is supportive
- It is vital to make early decisions around appropriate ceilings of care;
- Support hypoxia with oxygen, encourage oral fluid intake, avoid aggressive intravenous fluid resuscitation
- Sepsis is uncommon in primary Covid-19 infections. Where present, additional bacterial infection is probable.
- Wheeze can be treated with bronchodilators
- Assess for and treat complications of bacterial superinfection and for deterioration
- Steroids are not generally helpful and should be avoided unless there is another clear indication

**When to contact Respiratory for advice or support**

- For escalating oxygen requirements, if patient is for full escalation then early discussion with intensivists will be required
- Early onset of mechanical ventilation may be required in the advent of hypercapnoeic respiratory failure (RF)
- If imaging findings are inconsistent with Covid-19 then consider whether a CT scan of Chest is likely to alter management
- Patients with underlying co-morbidities or chronic respiratory disease are particularly vulnerable

**Investigations**

- White cell count (WBC) tends to be normal
- Lymphopoenia is common
- Mild thrombocytopenia is common
- C reactive protein (CRP) correlates to disease severity; respiratory failure with a normal CRP is unlikely to be Covid-19
- High CRP in confirmed Covid-19 is a poor prognostic indicator and may suggest complicated disease
- Procalcitonin tends to be normal

**Radiology**

- Chest radiograph (CXR)
- May show patchy ground glass changes, peripheral and basal, but may be subtle and are non-specific
- Pleural effusion is uncommon
- Cavitation, lymphadenopathy, masses are uncommon
- Computed Tomography (CT) scan of Chest
- A CT will not add to management unless there are inconsistent findings on the CXR and should therefore be avoided

**Management**

No antiviral has been proven to be active against COVID-19 but general principles of managing viral pneumonia and ARDS remains. There has been some concern about non-invasive ventilators (NIV) and high flow nasal oxygen (HFNO) in terms of transmission to hospital staff. Recent publications suggest that newer HFNO and NIV systems with good interface fitting do not create widespread dispersion of exhaled air and therefore should be associated with low risk of airborne transmission. Invasive ventilation poses a risk during intubation. Principles of ventilation is as per ARDS protocols (tidal volumes around 6 ml/kg). There is some evidence that prone ventilation is of benefit as is a permissive hypercapnoea.

**Prognosis**

The vast majority of patients who are infected will have a mild disease and do not get significantly ill or require hospitalisation. About 10-20% of those admitted to hospital will need critical care input. Mortality is reported to be between 2-5%. Risk factors include older age, coronary artery disease, hypertension, diabetes mellitus and Chronic obstructive pulmonary disease

RESOURCES

https://www.cdc.gov/coronavirus/2019-ncov/publications.html

https://www.nhs.uk/conditions/coronavirus-covid-19/